

“Uploads, Faxes, and You: Can Personal Identity Be Transmitted?”

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Abstract. Could a person or mind be uploaded—transmitted to a computer or network—and thereby survive bodily death? I argue ‘mind uploading’ is possible only if a mind is an abstract object rather than a concrete particular. Two implications are notable. One, if someone can be uploaded someone can be multiply-instantiated, such that there could be as many instances of a person as copies of a book. Second, mind uploading’s possibility is incompatible with the leading theories of personal identity, insofar as these assume the mind is a concrete particular. Moreover, because David Chalmers (2010; 2012; 2014) defends mind uploading without construing minds as abstract, I show Chalmers’ argument to be unsound.

Keywords: Personal identity, mind uploading, consciousness, Chalmers, artificial intelligence

1. Introduction

Suppose in the future a dying person receives an offer: ‘if you upload your mind to a computer or network’, the person is told, ‘it can be downloaded into a new body and you won’t have to die’. Would such an offer be desirable? Not if what is offered isn’t really possible, I assume.¹ So could a person survive uploading, or would the process merely produce some sort of digital clone, similar but not identical to the dying person?

In this paper I argue a mind can be uploaded only if a mind is an abstract “informational” object rather than a concrete particular. The basic idea is familiar: just as one can upload the information contained in a book but not a particular pulp-and-ink copy, so could a mind be uploaded only if that mind is the information stored in a body or brain, rather than the body or brain itself. But then just as every copy of an uploaded book would

¹ Granted, uploading might still be desirable even if it couldn’t preserve identity, but instead created a numerically distinct clone who would look after the original’s loved ones, say. So the phrasing here should be taken as restricted to uploading as a (putative) means for preserving personal identity. Similar qualifications should be taken to apply throughout the paper, *mutatis mutandis*. My thanks here to an anonymous referee for *American Philosophical Quarterly* for the suggestion.

have equal claim to be the book itself, so would every digital copy of a person have equal claim to be the person him or herself- regardless of which came first.²

Though something like this has been suggested previously, there are several reasons to consider the view as presented here. One is I situate the idea amongst more general considerations regarding the nature of information-transmission. In addition to its general metaphysical import, doing so reveals imprecisions in the formulation of certain thought-experiments relevant to mind-uploading. A second reason is I clarify the relationship between mind uploading and leading theories of personal identity. More strongly, I argue these theories are incompatible with mind uploading insofar as they presume a mind is a concrete particular. Notably, this includes the Lockean or memory theory, which one might assume would be friendly to mind uploading.

There are also further upshots. For instance, because David Chalmers (2010; 2012; 2014) has recently defended mind uploading without construing minds as abstract, I show Chalmers' argument is unsound. That said, in closing I also suggest a way forward for those who would defend uploading; though I take no stand on the necessary condition I defend being satisfiable, I do suggest some *prima facie* objections to uploading need not be decisive.

2. Faxing, uploading, and teleportation

² The reader may note a move here from uploading a *mind* to preserving a *person*. Rather than an equivocation or implied equivalence, this move is only intended to capture the literature's standard (if implicit) assumption that uploading a mind would suffice for uploading a person, i.e., that where the mind goes the person goes. Nonetheless, this leaves open important questions about the relation(s) between minds and persons, as well as what kind of entities minds or persons are. Rather than defend positions here, however, my aim is simply to explore the question of mind uploading given the same general assumptions made in the literature—viz., that a mind is such that its being uploadable is at least *prima facie* coherent, and that preserving mental identity suffices for preserving personal identity, whether minds and persons are identical or not. (Thanks to an anonymous referee for *American Philosophical Quarterly* for helpful discussion here.)

In this section I set out several related claims concerning information-transmission, which I then apply to mind uploading. I'll begin with a personal anecdote.

As a child I was mystified by my father's fax machine: how could a piece of paper be sent to another house over a telephone line? And why was the paper still there after it had been faxed? Eventually I realized a fax machine is not some sort of teleporter, but is instead, in effect, a remote-controlled printer: by scanning the paper at one end, the sending fax was collecting instructions for what a printer on the other end (the receiving fax) was to print. Those instructions were then sent over a telephone line, and, when received, the machine on the other end would print a piece of paper with the right pattern of markings, just as surely as if the receiving fax was a printer directly connected by a cable to the personal computer the initial message was typed on.

The word 'fax' derives from 'facsimile'. So to fax something is, by definition, to create a facsimile or duplicate- here, a second piece of paper. And of course it is the shared information or content that makes the second paper a duplicate, rather than just another (unrelated) piece of paper. So the very idea of faxing seems to presuppose a distinction between information that can be shared or transmitted, and the pieces of paper themselves, which are not shared or transmitted- even if they could, in principle, be teleported.

Though this distinction may sound natural, philosophical convention may engender some confusion here. Whereas 'fax' derives from 'facsimile', 'teleport' derives from 'tele' meaning 'distant' or 'from afar', and 'portare' meaning 'carry'. To teleport is therefore to carry over or from a distance. For this reason the word was introduced in science-fiction to denote an object's (nigh instantaneous) travel over great distances, often via wormhole or superluminal velocity. So construed, a fax machine is not a teleporter precisely because it does not transport or carry the paper over a distance, but instead duplicates the information

while leaving the original behind. Yet recent philosophical usage has blurred the distinction. Famously, Parfit uses the term ‘teletransportation’ to describe a scenario in which “a scanner records” one’s bodily states, after which the “information is then transmitted at the speed of light to some other planet”, resulting in the reconstruction of a “replica” (1987: 352). Yet etymologically construed this sounds like faxing, and unlike tele(trans)portation. So despite the now-conventional usage Parfit engendered—for example, Shoemaker drops the ‘trans’ and refers to Parfit-style scanning scenarios as ‘teleportation’ cases (1997: *passim*)—I will use the terms in their etymologically accurate senses for reasons just described, as well as for further reasons soon to be given.³ (This includes an argument in section 4 regarding Chalmers’ use of the phrase ‘gradual uploading’, which I’ll show involves a similar mistake.)

Terminology should not distract from the substantive issues here, however. For one, the distinction between the transmitted information and the object storing that information is not specific to faxing, or even any form of technology. Nor is the idea that transmitting information involves sending instructions for recreating or duplicating that information on the receiving end. When I speak into a telephone for example, in one sense my voice is transferred or transmitted over phone lines and perhaps across the world. But of course that doesn’t deprive me of my voice as if I were mailing my larynx in a box via the postal service. Just by speaking into the telephone receiver the information carried by my voice is encoded—which is to say, a (potential) copy of my voice is created—and then, on the other end, a speaker in the receiving phone reproduces my voice according to the instructions sent along the line. The same sort of process occurs even without technology: when speaking out loud my voice causes perturbations in the air, and in these sound waves the information is

³ It has been suggested that Parfit’s use of ‘teletransportation’ derives from a similar use on *Star Trek*. This remains a matter of internecine debate, however, as the television show did not provide much detail (nor philosophical sophistication) as to how the device in question is supposed to work.

sent along and transduced, ultimately appearing in the brain(s) of the listener(s) as a duplicate or copy—i.e., another instance—of my original utterance.⁴

When I was a child learning about fax machines, the word ‘upload’ was not yet in common parlance. Nonetheless faxing is in effect a kind of uploading. According to Merriam-Webster for instance, ‘uploading’ is defined as the “transfer [of] (data) from one computer to another, typically one that is larger or remote”, whereas a fax is defined, more specifically, as a scanned image of a document that is “transmitted as data by telecommunication links”. Although faxing was largely a pre-internet phenomenon, involving a direct connection over phone lines without the mediation of a graphical user interface or web browser, uploading to the internet is not fundamentally different: when one uploads a file, one transmits data from a source to a receiver (e.g. from a computer or smartphone to a network or other computer), just as data is transmitted between fax machines. So perhaps some contemporary children are as mystified by uploading as I was by faxing; ‘how can a video on my phone end up on the internet?’, one might ask. ‘And why is the video still on my phone after I’ve uploaded it?’. Naturally, the answer is the same now as then. When information is uploaded to the internet, a copy of that information is created on a server or website. And when information is downloaded from the internet, a duplicate is

⁴ Though some may find this description of transmission-as-duplication natural, others may balk. Perhaps it sounds odd to say a copy of an utterance appears in the brain of a listener, or that a telephone receiver copies my voice rather than extends its reach (thanks to an anonymous referee here). But this is a false dichotomy. Consider an echo, which is a copy or duplicate of a voice if anything is. Yet arguably an echo is a duplicate precisely *because* it’s an extension of the voice. Nor is there anything special about an (audible) echo; the same also goes for the (visual) duplicate in the mirror. Generalizing from such examples suggests duplication is the concomitant of information-carrying waves interacting with their environment (via e.g. reflection or refraction). So the more general idea suggested here is that what it is to send information just is to duplicate that information, and what it is to duplicate information just is to send it. Another example might help: to create a new copy of a book just is to propagate the information contained in that book, and to propagate the information just is to copy the book. It’s worth adding that for related reasons I take the intimate link between transmission and duplication to explain why the concepts of redundancy and repetition are foundational in Shannon-style information theory, though space precludes a detailed discussion here.

created on one's hard drive. In both cases the original remains as is, with the transmission amounting to a series of instructions for rendering that information as another usable copy.

Return now to mind uploading. Forms uploading might take will be discussed in more detail later, but for now the idea is that one's mind could be transferred or transmitted to a computerized brain, network, or server, with the possibility of later being downloaded into (or conjoined with) a new body. From here the key question is whether this process could preserve personal identity, or merely produce a facsimile.

Reflecting on "mind faxing", rather than mind uploading, should make the issue clear. Suppose my brain is scanned, after which the information is printed, faxed, and reprinted on the other end. Because only the information but not the paper is transmitted by fax, strictly speaking, I can be faxed only if I am identical to the information, rather than the paper containing it. So the same goes for uploading- of which, I have suggested, faxing is a type. Accordingly, if the information in my brain is uploaded to a network or server, then I am uploaded only if I am the information, rather than the object(s) it's stored in.

This suggests mind uploading presupposes a (perhaps radical) metaphysics of persons or minds:⁵ namely, that persons or minds are the kind of thing that can be transmitted as telecommunication data or via Wi-Fi networks, say, rather than the kind of thing that cannot. Put another way, in retrospect my childhood self committed something of a category mistake by thinking a piece of paper, rather than the information it stored, was capable of being faxed. For similar reasons it would seem human bodies or brains are not the kind of thing that can be faxed. Because faxing just is a kind of uploading, they are not fundamentally different. So mind uploading requires persons or minds be akin to faxable information, rather than akin to pieces of paper or human bodies, which lack that capacity.

⁵ The phrase 'persons or minds' is intended to convey a disjunction, not an equivalence (cf. note 2).

So-phrased this suggests material objects are incapable of being transmitted as or via information, and I do think that's right. But perhaps one might think certain material objects could be transmitted via information. For instance, one might think the faxed letter is a material object coincident with, or constituted by, the piece of paper on which it appears. Then at least some material objects—those coincident with or constituted by other material objects—would be capable of being transmitted as information after all.⁶

Construing the letter this way is problematic for several reasons, however. The most important is it would render a material object multiply-locatable in a way typically thought reserved for abstract and so non-material objects. Note that in typical cases the faxed letter would remain constituted by or coincident with the still-intact source paper, even after the letter is transmitted and comes to coincide with the paper(s) on the receiving end(s). While abstract objects are assumed capable of multiple-locatability by being instantiated or realized in distinct material objects in distinct locations, material objects themselves are traditionally distinguished from *abstracta* for lacking these very features; unlike *abstracta*, concrete material objects are singly-located and admit only of qualitative duplication, not multiple-instantiation or multiple-locatability.⁷ It is therefore more natural to construe the (faxed) letter as an abstract object *realized* or *encoded* by each successive material form in the faxing process, rather than constituted by or coincident with each. Hence I will assume material objects

⁶ My thanks to an anonymous referee for this journal for offering this objection.

⁷ Consider two more resulting problems only alluded to above. For one, construing the faxed letter as material would imply a material object can undergo radical changes in the *type* of its parts- e.g. the letter would first be constituted by or coincident with paper, and then by radio waves or wireless data, say, and then by paper yet again. While material objects are thought able to change parts, it is generally assumed the parts must be homogenous or of uniform type (e.g. even if a river can change *which* water molecules make it up, it must be made up by *water* molecules). Second, and consequently, this view would also imply material objects can radically change their properties. For example, when constituted by wireless data but not paper, the letter would be invisible and (nigh) weightless, and be able to travel close to the speed of light. That material objects can radically change their properties—and then change back again when the fax is received—is also quite implausible.

cannot be transferred or transmitted by or as information. So as argued, a mind is uploadable only if that mind is information, rather than the material medium that stores it.⁸

3: Information, concrete particulars, and uniqueness

If this is right, what are the implications for identity and survival? Consider two cases in which an artist hopes his or her work will survive. In the first case suppose the artist is a novelist, and, in the other, a painter. Would the novelist be satisfied if the novel was copied and redistributed, even if previous copies were destroyed? I assume so; regarding a book's survival any copy appears just as good as any other. Would the painter be satisfied if the painting was copied and redistributed, even if the original was destroyed? Here I assume not. For when it comes to paintings there is a considerable difference between an original and a copy, forgery, or counterfeit- no matter how similar.

I take this distinction between books and paintings as a given. From here, two implications are worth emphasizing. First, if an author who wishes her book survives need not be concerned that any particular copy survive, but only that some does, this implies the first copy has no special import. Regarding books there is therefore no such thing as the distinction between the real or genuine article, and a mere forgery, imposter, duplicate, or clone.⁹ Yet as noted above, this is not the case for paintings.

Second, this implies that books but not paintings are good candidates to be preserved by uploading or digitization. For instance, whereas it is quite plausible to think a novel is preserved by being scanned and uploaded to Google Books, the analogous Google

⁸ Proponents of uploading often suggest persons *are* informational "patterns" (e.g. Kurzweil 2000; 2006), though they do not necessarily defend persons having to be this way to be uploadable.

⁹ Of course, the issue is different if one is interested in the identity of a particular *copy* of a book, e.g. the copy that once belonged to so-and-so. But in that case it would be quite implausible to say that uploading can preserve the identity of that particular copy, for reasons already discussed.

Arts project is unlikely to have the same import; though it may be handy to see (and search for) images of great works of art, and even if an image surviving is better than nothing, it cannot be said that this digitizing project literally preserves paintings in the way it preserves fiction. So naturally the same applies to faxing: while a book could be preserved by fax even if the source pages are destroyed, only an image of a painting could be faxed- not the painting itself.

These distinctions—that books can be preserved by copying and digitization but paintings cannot, and that paintings admit of the genuine article/forgery distinction in a way that books do not—are something I take for granted as data. And the natural explanation of these data is that books are abstract objects whereas paintings are not: it is because *abstracta* are by their nature multiply-instantiable that there is no question of which instance of a book is genuine rather than a mere copy. By contrast, because a painting is a concrete particular, any qualitative duplicates are mere copies, counterfeits, forgeries, or simulacra.

So assuming abstract objects are uniquely capable of multiple-instantiation, returning to mind uploading reveals an important tension. On the one hand, a common presupposition regarding personal identity is that persons are particular and unique; the default assumption is that any qualitative or atom-for-atom duplicate of a person would be a mere clone or imposter.¹⁰ On the other hand, I've argued uploadable objects are abstract objects, and that there is no genuine article/mere copy distinction for *abstracta*. So even if a

¹⁰ Fission cases are thought to be troubling, I presume, precisely because they threaten the putative uniqueness of the self, insofar as each post-fission being appears to have equal claim to be the person in question. If selves are multiply-instantiable as books are, however, there would likely be no concern with fission cases; like copies of a book, all instances would be on par. That said, perhaps one might think fission cases are troubling because if the post-fission beings are distinct from each other but identical to the pre-fission being, then transitivity is violated. But if people are abstract and so multiply-instantiable, transitivity isn't violated; distinct post-fission particulars could instantiate the same person without being numerically identical to the initial particular. So persons being abstract would obviate the concern over fission cases after all.

post-upload particular is numerically distinct from a pre-upload particular, if minds are uploadable these particulars could still have the very same mind, just as two copies of a book contain the very same book. And of course this need not stop at two: if a mind is uploadable there could be as many instances of that mind as there could be copies of a book.

If this is right, one important implication is that mind uploading is incompatible with the standard theories of personal identity. Consider: though they disagree over a person being an immaterial soul (the traditional religious view), a biological animal (e.g. Olson 2007), something constituted by a biological animal (e.g. Baker 2002), or an entity individuated by its psychology or memories (the Lockean view), each of these theories take memories, minds, and persons to be concrete particulars- such that, at most, only one of two duplicates can be the real person, or the real owner of those memories.¹¹

This is worth emphasizing, as one might think competing theories would differ with respect to mind uploading. For instance, it is likely obvious that animalism would take a dim view: if a person just is a biological animal, that a person could be extracted and transmitted to a server and then downloaded into a new (perhaps robotic) body seems like a non-starter. By contrast, one might think the constitution view might be friendly to it. For insofar as a person is thought distinct from its body (though constituted by it), one might think a person could be constituted by a wholly different body- including, perhaps, a robotic or digital one. Yet I argued earlier that constituted material objects cannot be transmitted, and so *a fortiori* cannot be uploaded- even if they could change their parts and so in that sense come to have a new body. Thus, even if the constitution view is compatible with persons replacing their

¹¹ One might think the branching/non-branching reproduction distinction makes a difference here. Insofar as this concern is associated with Parfit's arguments for relation R or *survival* mattering as opposed to *identity*, I will put such concerns aside.

organic parts with robotic parts, thereby rendering persons *cyborgs*—or ‘cybernetic organisms’—this does not entail they could come to be *uploads*, or uploaded beings.¹²

One might also assume psychological or Lockean theories would be friendly to mind uploading. For such views commonly appeal to the idea of memories being transferred from one body to another, resulting in the person ending up where the memories are. And if so, one might think those memories could just as well be transferred or uploaded to a digital storage device, after which downloading to a new body seems like a real possibility.

There is a crucial ambiguity in the idea of ‘transferring’ a memory, however, the resolution of which matters here. On one disambiguation, transferring a memory might mean transferring the *contents* of that memory— a process akin, presumably, to a fax machine transferring the contents of a piece of paper. But on a second disambiguation it might mean transferring the memories along with the object they’re stored on (or in)— a process more akin to mailing a letter than faxing one. Yet it is this latter sense that is often operative in the psychological or memory theorist’s thought-experiments, such as when a “brain transplant” yields old memories in a new body, or when Locke imagines the soul of a prince, “carrying with it the consciousness of the prince’s past life”, entering the body of a cobbler (*Essay on Human Understanding* Bk. 2 Ch. 27). But memories being transferrable this way—via brain-transplant or what one might call a Lockean “soul transplant”—does not establish the possibility of uploading any more than mailing a letter shows it’s possible to upload a piece of paper as opposed to the information it stores. If, however, memories are said to be transferred as contents are transferred—which is to say, as a letter is faxed or a file uploaded—then this amounts to duplicating or recreating those memories in the second

¹² The difference is crucial: cyborgs live offline, not online, and are mechanical beings, not informational objects. Succinctly put, maintaining self-identity with mechanical or robotic parts does not entail being transmittable as information to a numerically distinct network or server.

location, for the simple reason that that's just what it is to transmit information, as discussed earlier. So either this renders survival-by-upload a nonstarter on the grounds that such duplicates would be mere clones, or else a person would have to be an abstract object capable of multiple-instantiation to be transmitted this way, as argued previously.¹³

Lastly, note that the four-dimensionalist theory does not *eo ipso* allow for uploading either. Suppose a person is a mereological fusion of temporal parts, and therefore a concrete particular. Still, that the earlier temporal parts of something may take a different form from its later temporal parts does not imply the earlier (stage of that) being *becomes* the later (stage of that) being. To illustrate, note that four-dimensionalism is generally a universalist or maximalist view, according to which any arbitrary set of (temporal) parts composes a whole.¹⁴ Thus the four-dimensionalist ontology will include 'arbitrary' fusions such as the early temporal parts of a particular trout plus the later temporal parts of a particular turkey.¹⁵ Such an object existing does not entail that an early-stage trout transformed into or became a late-stage turkey, however. For the trout itself is not the arbitrary fusions that include it. Similarly, even though according to the four-dimensionalist there is a fusion of Napoleon's temporal parts and the temporal parts of the international space station, this does not imply that Napoleon became a space station. So even if there is a four-dimensional object consisting of my temporal parts plus the temporal parts of a post-upload being that seems to share my memories, this does not entail that I become a post-upload being (cf. Olson 2017: 52). More generally, being part of a four-dimensional fusion that includes a post-upload

¹³ Shoemaker uses the phrase "brain state transfer" to refer to a process whereby x's brain states are "imposed" on y without any matter being transferred (1997: 285). Though he finds this plausibly person-preserving, he ultimately concedes that he cannot square this intuition with the idea that a mind is an individual substance (ibid., p. 301). My argument here explains why he cannot resolve the "conflict": for to be informational is to be abstract, and therefore not an individual substance.

¹⁴ See Sider (2001) for a classic expression and defense of this view.

¹⁵ This example is meant to invoke Lewis' famous example of a trout-turkey fusion; see his (1991: 7).

being is not sufficient for a person being uploadable. Instead, only if my memories could actually be transferred or transmitted to that uploaded being could I be that being. But that transference is possible, I have argued, only if I (or my memories) are abstract and so capable of being transmitted as information is.¹⁶

4. Objection: Chalmers and the argument from “gradual uploading”

David Chalmers has recently defended mind uploading (2010; 2012; 2014). He does not construe persons or minds as abstract, however, and he seems to assume they are concrete particulars. So I will construe Chalmers’s argument as an objection to the central claim I’ve defended.

The argument begins with an overview of forms uploading might take. According to Chalmers, the

process of migration from brain to computer is often called *uploading*. Uploading can take many different forms. It can involve gradual replacement of brain parts (gradual uploading), instant scanning and activation (instant uploading), or scanning followed by later activation (delayed uploading). It can involve destruction of the original brain

¹⁶ One might also wonder here whether endorsing a “simple” or “complex” account of personal identity matters to uploading. Though space precludes a detailed discussion, there are reasons to think it does not. Firstly, what exactly the distinction amounts to, whether it ought to be made, and which views fall on which side of the line, are all very much in dispute (see esp. Olson 2012 and Hummel 2017). Secondly, simple and complex accounts of personal identity are not positions or views of personal identity, but *families* or *groupings* of positions or views of personal identity (cf. Hummel 2017: 364). So even were the general distinction clear, one could simply address the particular accounts of personal identity with respect to uploading irrespective of their more general groupings- something I did above. Put another way, insofar as the just-canvassed views just are the views that are classified as simple or complex, characterizing those views at a more general taxonomic level would not alter my conclusion. To further see this, note that to the extent that the simple/complex distinction is clear, it runs as follows: simple accounts hold there are no substantive further facts in virtue of which personal identity holds, whereas complex accounts hold that there are (Noonan 2011: 74). Yet even for simple accounts there must be criteria for *believing* identity is or isn’t preserved in some case. But then my just-given arguments could be taken as reasons to think those criteria are not satisfied in uploading cases- unless persons or minds are first taken as abstract. Much the same goes for complex views: here my arguments would imply that amongst the substantive further facts that must hold for uploading to preserve identity would be the non-concrete nature of minds or persons. Thus, whether simple or complex, only views that take persons or minds to be non-concrete can endorse uploading as a means of preserving personal identity.

parts (destructive uploading), preservation of the original brain (nondestructive uploading), or reconstruction of cognitive structure from records (reconstructive uploading) (2010: 41; cf. 2014: 102).

Ultimately Chalmers argues the best prospect for mind uploading is via what he calls ‘gradual uploading’. He starts with an argument that concedes that nondestructive instant uploading would not preserve identity, however. The argument is simple and likely familiar. Suppose Dave were uploaded into a computer without the original brain and body being destroyed. The result would be two conscious beings: ‘BioDave’ and ‘DigiDave’.¹⁷ Assuming only one can be (identical to) Dave, Chalmers grants the natural thought is that BioDave is Dave, with DigiDave being a digital clone. From here, the argument against (instant) destructive uploading preserving identity is that destroying BioDave after the creation of DigiDave would not change the fact that DigiDave wasn’t Dave the first time around; for Chalmers, destruction making the difference would make identity “unacceptably extrinsic” (2010: 51). So in either destructive or non-destructive instant uploading, DigiDave would be similar but not identical to (Bio)Dave.¹⁸

Nonetheless, Chalmers not only defends “gradual uploading” preserving identity, but destructive uploading as well. The argument runs as follows. Suppose 1% of Dave’s brain “is replaced by a functionally isomorphic silicon circuit” each month, such that, after 100 months, “a wholly uploaded system will result”; call it ‘Dave₁₀₀’. Assuming functional

¹⁷ Here Chalmers helps himself to his earlier (1995) arguments for functionalism, according to which consciousness is an “organizational invariant”, such that if a biological carbon-based brain and a robotic silicon-based brain are in the same functional states—are organized in the same way—then both will have the same states of consciousness. For the sake of argument I will accept this premise.

¹⁸ Chalmers does briefly explore possible responses to this argument, such as the Parfitian (1984) response of treating this as a fission case, with the original standing in the special Relation R (or survival relation) to both successors, the result being that Dave survives as both Bio and DigiDave—his closest continuers—even if they are not identical. Not only does Chalmers think this raises “uncomfortable questions about whether DigiDave has the same rights as BioDave when both survive” (2010: 52), but also that the fission reply will simply be inadequate for anyone who still believes identity (rather than survival or Relation R) is really what matters. As I am also restricting the discussion to identity (as noted earlier), I’ll put this debate aside.

isomorphism preserves consciousness, $Dave_{100}$ will have mental states qualitatively identical to Dave's. But would $Dave_{100}$ be Dave? Chalmers says 'yes': for $Dave_1$ —the system after one month with 1% replaced—would be Dave, as would $Dave_2$ after two months and $Dave_3$ after three months. For identity can be preserved over small incremental replacements. So when the “wholly uploaded system after 100 months” comes to be, it is natural to think $Dave_{100}$ is in fact Dave (2010: 52; cf. 2014: 111).

From here Chalmers simply speeds up the process: if “Dave’s brain is gradually uploaded over a period of hours, with neurons replaced one at a time by functionally isomorphic silicon circuits”, Dave would survive this as well. For the rate of replacement is not ontologically significant. So if the process accelerates from “hours to minutes”, and then from minutes to seconds, eventually reaching the “limit point” of “instant destructive uploading, where the whole brain is replaced at once”, Dave would survive this too (2010: 53). Succinctly, Chalmers formulates the argument as follows:

1. Dave survives as $Dave_{100}$ in gradual uploading.
 2. If Dave survives as $Dave_{100}$ in gradual uploading, Dave survives as DigiDave in instant uploading.
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3. Dave survives as DigiDave in instant uploading (2010: 54; cf. 2014: 113).

Thus Chalmers provides countervailing reasons for thinking Dave does survive as DigiDave, despite the earlier argument to the contrary. Therefore uploading can preserve personal identity after all. And insofar as nothing here requires minds be abstract, Chalmers’ argument being sound would seem to refute the central claim I’ve defended.

So what if anything is wrong with the argument? Naturally the key move is premise 2, which takes Dave’s being able to survive as $Dave_n$ via gradual uploading as a reason to think Dave can survive as DigiDave in instant uploading. The core problem, however, is

being “gradually uploadable” is no reason to think one could actually be uploaded. The reason is simple: despite the name, ‘gradual uploading’ is not really uploading.

Recall that according to Chalmers, the “process of migration from brain to computer is often called *uploading*”, and that “uploading can take many different forms”, including the “gradual replacement of brain parts (gradual uploading)” as well as “instant scanning and activation (instant uploading)”. But what makes these processes similar? Note the analogous claim regarding faxing is plainly false. Suppose one claims the “process of migration from paper to paper is often called *faxing*”, and that “faxing can take many different forms”, including the “gradual replacement of paper parts (gradual faxing)”, as well as “instant scanning and activation (instant faxing).” Simply put, I see no reason to think that gradually replacing the parts of a single piece of paper is at all similar, in degree or kind, to the process of scanning or copying the information contained on that paper, and then transmitting that information to a distinct receiver. Rather, it seems more intuitive to say that ‘gradual faxing’ isn’t faxing at all, despite the name. The reason: even if I’ve gradually replaced the parts of a single piece of paper whilst preserving its identity, nobody else will have received a fax.¹⁹

More generally, what Chalmers calls “gradual uploading” is just part-replacement, and part-replacement is not uploading for the simple reason that it does not require the transmission of information outside the boundaries of the original object. So no matter how quickly parts are replaced inside a body, this simply has no bearing on whether a person could survive the transmission or uploading process- a process which, by definition, extends beyond the borders of the source of the transmission (in this case, the human body).

So what explains this situation? Part of the problem is an ambiguity in Chalmers’ phrase “this process of migration from brain to computer is often called *uploading*”. In

¹⁹ But what if the original parts are put together again elsewhere? That would just be a very inefficient means of faxing, and so not a counterexample to the lack of a faxed copy in the described case.

particular there is an ambiguity between a migration (transformation?) of the *brain itself* from a biological to a silicon form, as opposed to the migration of *the information* stored in the brain to a distinct storage device. Put another way, there is something like the hardware/software distinction here: just as there is a difference between replacing hardware parts and copying the software that runs on them, so is there a distinction between replacing hardware parts and uploading the information stored in those parts.

Nonetheless, Chalmers uses the words ‘uploading’ and ‘upload’ indiscriminately between these two senses of ‘migration’: for example, he not only describes DigiDave—the creature formed from BioDave’s information having been scanned and transmitted—as “an upload”, but he also applies the term to the being with a silicon brain (‘Dave_n’)- even without the information in that brain having been transmitted outside that brain. So either there is an equivocation over ‘upload’ here, or else an unjustified assumption that part-replacement and information-transmission are different forms of the same kind of process- viz., uploading.²⁰ But as just argued, they are not. So there is no reason to accept Chalmers’ crucial premise 2- that “if Dave survives as Dave₁₀₀ in gradual uploading, Dave survives as DigiDave in instant uploading”. For there is no real similarity between these processes, but only a nominal one.²¹

²⁰ Cf. Pigliucci (2014: 125), who makes a similar criticism. That said, and to be fair, Chalmers is not alone in using ‘uploading’ this way; for instance, Agar (2011) also uses the term to cover the “replacement of neurons by electronic chips” (p. 23). And though Bamford and Danaher (2017) distinguish part-replacement from uploading (p. 8), they nonetheless classify each as ways of copying or reproducing information, which, I argued above, is a mistake (provided the part-replacement does not involve rebuilding a copy outside the boundaries of the original object; cf. note 19).

²¹ Tellingly, there has been some confusion about what exactly uploading involves. In their criticism of Chalmers, for instance, Corabi and Schneider (2012) contend that no matter how long the process of uploading takes, there will be a “dramatic moment at which the data is assembled by the computer host and the [functional] isomorph is born” (p. 40), which they find problematic. Chalmers responds, however, by saying “they are conceiving of gradual uploading in the wrong way”, and that “there is no dramatic moment” because neurons are simply “replaced one at a time”, leading from a 100% biological system to a 99% biological system, and so on (2012: 160). In my view, however, their misunderstanding is only natural, as, in effect, Corabi and Schneider are taking ‘uploading’ in the standard sense of involving data transmission between a distinct source and receiver, such that, were an intelligent system constructed at the receiving end, presumably it would only become conscious

Perhaps, though, one might think I'm overstating the differences between part-replacement and information-transmission, or, in Chalmers' terms, the difference between gradual and instant uploading. For one might think part-replacement involves the transmission of something's identity over time, and, were this so, that this is what would be involved in uploading: the transmission of (personal) identity from one system (a biological brain) to another (a computerized brain). In fact, Chalmers suggests something similar when raising an objection to his argument that instant uploading would preserve identity; there he notes that many find it natural to think "intermediate systems play a vital role in the transmission of identity from one system to another", such as when planks are gradually rather than instantly replaced in the ship of Theseus case (2010: 55; 2014: 133).

But this line of response is mistaken. For one, the just-quoted phrase "the transmission of identity from *one system to another*" (my emphasis) is, strictly speaking, improperly formulated. For identity is a relation between a thing and itself, not some thing and another thing. So identity cannot be transmitted from one system to another, as Chalmers puts it; if identity can be transmitted at all, it can only be from one system to itself. So perhaps a more charitable reading is to think "the transmission of identity from one system to another" invokes the transmission of identity from a system at one time to the same system at another time; when an object changes its parts, for instance, perhaps its identity is transferred or transmitted from $x\text{-at-}t_n$ to $x\text{-at-}t_{n+m}$.²²

But this is not the case. For *preserving* the identity of one object over part-replacement is not transmission in the same sense as when information is transmitted from a source to a

when a certain critical threshold of data or processing was met. Because Chalmers is applying 'uploading' to the part-replacement of one self-same entity, however, he, unlike Corabi and Schneider, finds it natural to think "uploading" (part-replacement) occurs continuously throughout identity-preservation, rather than requiring a discrete or binary transition.

²² I assume this point holds, *mutatis mutandis*, for both the three- and four-dimensionalist.

numerically distinct receiver. In fact, this idea is also built into the relevant etymology: ‘transmit’ is from ‘trans’, meaning ‘across’, and ‘mittere’, meaning ‘send’. To transmit is literally to “send across”. So when one transmits information one is literally sending the information across a connection or medium, such as airwaves, telephone cables, or a wireless router. And as discussed, such a process of ‘sending across’ requires numerical distinction between source and receiver, as well as a channel between them. Part-replacement of one self-same entity, on the other hand, does not “transmit”, or send across, anything to anything (or anywhere) else- at least, nowhere outside the boundaries of the object itself. So not only does part-replacement not involve transmission in the strict and literal sense, but it appears identity cannot be transmitted at all.

On this latter point, though, perhaps what one has in mind when thinking identity can be transmitted is that time is, in effect, the channel over which identity can be sent. For instance, when discussing identity and part-replacement regarding the ship of Theseus, it is common to illustrate the scenario with a drawing of a ship with the label ‘ t_1 ’, likely on the left hand side of the paper or chalkboard, along with another drawing of a ship, with the label ‘ t_2 ’, further to the right. Seeing that these chalk-markings are numerically distinct, and seeing that time is often represented via a line or arrow pointing from left to right, such illustrations make it natural to think the identity of the ship is transmitted, across the channel or arrow of time, from the ship at t_1 to the ship at t_2 . But this representation is misleading. For one, while the chalk-drawings are numerically distinct, the object represented is not (by hypothesis). So there is not a perfect isomorphism between representation and reality here. Second, consider units of measurement. In paradigm cases of transmission (e.g. voices transmitted by telephone, radiowaves transmitted by satellite), one can meaningfully ask about the rate of transmission—e.g. bit rate per second—as well as the quantity or amount of information

sent—e.g. 15 gigabytes. When identity is (putatively) transmitted from object x -at- t_n to x -at- t_{n+m} , however, questions such as ‘what is the rate of the transmission of identity?’ and ‘what is the amount or quantity of identity transmitted?’ appear to be meaningless, if not category mistakes (similar, perhaps, to asking ‘how fast does time flow?’). For if identity is transmitted its rate seems to just be (the speed of) time itself, and there seems to be no quantities or measurements involved at all; quasars don’t have larger identities than quarks, presumably, and they do not transmit their identities to their future ‘selves’ any faster or slower, nor with any greater or lesser fidelity, or with different probabilities of noise or distortion disturbing the signal.²³ This disanalogy suggests an object’s identity is not transmitted as information is.

Consider the idea one last way. Whereas identity is a reflexive relation, it is natural to think transmission is irreflexive: when a radio transmits a signal or a computer transmits data, the source and receiver are numerically distinct and separated by a channel. Because identity is reflexive and transmission is irreflexive, identity cannot be transmitted.²⁴

That said, suppose one concedes ‘gradual uploading’ isn’t really uploading, and that identity can’t be transmitted as information can. Still, perhaps one might think what we *call* these things doesn’t matter, and that Chalmers’ thesis remains of interest because, if he’s right about the ability to survive with prosthetic or robotic parts, this opens the possibility of surviving the death of one’s biological body.²⁵

²³ A four-dimensionalist who thinks of the object-at- t as a time-slice or temporal part of the four-dimensional whole object may be less inclined to speak of the transference or transmission of identity in the first place. For such talk seems to invoke a three-dimensional object, wholly present at any given moment, transmitting its identity across time, whereas, for the four-dimensionalist, an object is only partly present at any given moment, and wholly present only across its entire temporal spread, which itself does not move through (the channel of) time.

²⁴ Note that even if one part of something can transmit information to a distinct part of that same thing, this does not undercut transmission being irreflexive. Compare: I assume nothing can bring itself into existence, such that creation is irreflexive. Still, this does not rule out the possibility that one *part* of something could bring a distinct part of that same thing into existence.

²⁵ Thanks to Chad Vance for the suggestion.

Chalmers' thesis does not have this implication, however. After all, it doesn't follow from persons being able to survive wholesale change of their *organic* parts that persons can survive the death of their bodies; even if my body exists without any cells I was born with, this does not mean or entail that I have survived my own death, or that a previous me or version of me has died. That the replacement parts could be artificial rather than natural seems to make no difference here. By contrast, note that if a person is an abstract object, or is (or has) an immaterial soul, then it is at least plausible to think a person could survive bodily death. Yet the reason for this is that in both cases there is an entity—the information, or the soul—that is distinct from the body in such way as to make it conceivable that the entity could travel from that body to a new one (or in the case of the soul, perhaps, exist disembodied). As just argued, however, part-replacement, whether organic or artificial, does not require transmitting or sending anything beyond the boundaries of the original object. Nor does it invoke the requisite sense of distinction that could conceivably allow the (whole) person to be separated from its parts.²⁶ Calling part-replacement 'uploading', therefore, can only serve to mislead regarding the possibility of surviving bodily death.²⁷

Lastly, consider a more general reason to care about terminology here. Because processes such as teleporting, mind uploading, and brain-transplanting are *science-fictional*, we may have little purchase on what exactly such processes (would) involve, or what they

²⁶ Note that numeric distinction is necessary but not sufficient for separate existence. For example, a substance and its properties being nonidentical does not imply the substance could exist without its properties. So even a whole being distinct from its parts does not imply that a whole could exist separately from its parts, as a soul is thought capable of existing separately from a body. Note also that this provides a further justification for my earlier claim that constituted objects cannot be transmitted. For even though a constituted object can change its parts, it can't be separated from them; a constituted object changing its parts is not like a snake shedding its skin. By contrast, when information is transmitted it does leave the original behind, as constituted objects do not. My thanks to an anonymous referee for this journal for encouraging me to make this point more clearly.

²⁷ Recall that the word for a being that results from robotic part-replacement is not 'upload' but 'cyborg', itself a portmanteau of 'cybernetic organism'. And as noted earlier (note 12), cyborgs, unlike uploads, live offline not online, and are mechanical, not digital. So they cannot be uploaded or copied any more than pieces of paper, rather than the information they contain, can be faxed.

would or wouldn't render possible. This is why I've compared these science-fictional processes to their closest counterparts in reality, e.g. faxing and smartphone uploading, and why I've appealed to standard or etymological rather than stipulated definitions of terms such as 'uploading', 'transmission', and 'teleportation'. For that way, I have argued, we get a better sense of which processes, if any, would allow for genuine persistence- as opposed to a mere facsimile.

This emphasis on process also allows one to handle a final worry. One might object to my overall argument on the grounds that comparisons to books and paintings, or faxes or smartphone-uploads, are inadequate. For these objects lack subjectivity or 'what-it's-like-ness'. From a first-person point of view, however, many have argued it's perfectly sensible to imagine or conceive of oneself existing in a new body- including, perhaps, a post-upload body. And insofar as one need not construe such perspectives as (linked to) abstract objects, perhaps first-personal "further facts" about consciousness undercut my central thesis.²⁸

For the sake of argument I'll grant the objection's suppositions: that there are "further facts" about subjectivity vis-à-vis a base of third-personal facts,²⁹ and that such facts would allow for the logical or metaphysical possibility of one's mind or consciousness inhabiting a new form, e.g. another human, or even an insect, video game character, or battery chicken.³⁰ Nonetheless, these suppositions do not imply the possibility of mind uploading. One reason is that a mind's being transferable from one body to another is consistent with that mind being a singular concrete object. Because *concreta* are singly-located, such a mind could not exist *simultaneously* in a pre- and post-transfer body, let alone many

²⁸ My thanks to an anonymous referee for this journal for encouraging this discussion.

²⁹ See Conitzer (2019) for an interesting recent discussion on the question of further facts.

³⁰ Hare and Johnston (2009: 83) consider the imaginary case of waking up as a battery chicken. Conitzer (2019) imagines one's consciousness moving between numerous video game or virtual reality characters (vis-à-vis the question of further facts about consciousness, as mentioned in the previous note). My thanks to an anonymous referee for this journal for providing these references.

post-transfer bodies. Yet as discussed earlier, a book's being uploadable implies it can remain instantiated in the original and in countless copies simultaneously. So a mind's (hypothetical) transferability need not imply uploadability. Or, to invoke another comparison made earlier, just as pieces of paper can be transferable by mail without being faxable, so too could a mind be transferable without being uploadable. More generally, something can be transferable without being suited for any method of transfer.

A second argument buttresses this response. Suppose, with the objection, that the first-person conceivability of mind-transference implies the logical or metaphysical possibility of mind-transference. Yet this is still a far cry from a *nomologically* possible *process* by which we humans could actually effect such a transference. Backing up a step, consider the broader impetus for desiring mind uploading: the longstanding if not perpetual human desire to escape from sickness and bodily fragility, if not death and mortality itself.³¹ According to many religious traditions, such an escape can (or does) *actually* happen after the death of a given body, but only via a non- or supernatural process, such as divine intervention. Yet defenders of mind uploading do not typically believe it to be a mere logical or metaphysical possibility, or the exclusive provenance of God or supernatural forces, but something achievable by humans, via technology we (almost) have. The point is brought into sharper relief if one supposes physicalism is true, in which case non-or supernatural means of mind transference are ruled out. Yet even were physicalism false, and even if, somehow, the human activity of uploading was correlated with mind-transference via non-natural means—e.g. God ensuring a pre-established harmony—this still would be insufficient for uploading preserving *identity* unless minds are capable of occupying multiple bodies at a time; otherwise, one post-upload body would have the 'real' mind, with other bodies holding mere

³¹ Such themes are prominent in the writings of authors such as Bostrom (e.g. his 2005, *inter alia*), and Kurzweil (2000; 2006), as cited earlier.

imposters or clones. After all, if one assumes even God cannot do what is logically or metaphysically impossible—e.g. make $2+2=10$, or make two distinct objects identical—then even God cannot endow concrete objects with the features of abstract objects, such as multiple-instantiability or multiple-locatability. Thus, even God couldn't simultaneously implant a single mind in a pre-upload body and countless post-upload bodies- unless a mind were an abstract object, and so of the nature to be multiply-instantiated.

5. Conclusion

I have argued mind uploading is possible only if a mind is an abstract object rather than a concrete material particular, and so capable of multiple-instantiation. Proponents of uploading, then, need not argue that a digital post-upload being is identical to a biological pre-upload being, as Chalmers attempts. Instead, the defender of uploading must argue that minds are capable of multiple-instantiation in distinct bodies, just as books are multiply-instantiable in distinct pulp-and-ink copies.

But is such a view even plausible? Though I will not defend an answer, in closing I will briefly suggest a way forward for those who wish to defend uploading. The reason this is necessary is that some have thought the idea of persons or minds as abstract is effectively a non-starter. For instance, Parfit (1984: 297) suggests that if a person is abstract a person would be a type, and it's inappropriate to love a type (as one would love a person). But this isn't right. For one, not all abstract objects are "types". So a defender of uploading could argue there are salient differences between informational objects and standard-issue types.³²

³² Note that propositions, sets, Platonic forms, Aristotelian universals, and numbers might be different kinds of *abstracta*, as might ontological categories, types, and kinds themselves; perhaps these entities have importantly different features, despite all being abstract. Space precludes a detailed discussion, but the proponent of uploading may well benefit by treating informational objects as (yet another) *sui generis* kind of abstract object.

Second, it strikes me as perfectly appropriate to love abstract objects, such as when one loves a book or a symphony itself, as opposed to particular instances or performances.

Still, perhaps one might think a key difference here is an abstract object couldn't love one back (a point Parfit does raise).³³ More generally, Olson (2017: 49) suggests persons can't be abstract objects because abstract objects don't *do* anything, and so *a fortiori* don't love, or even change. Yet abstract informational objects can change: it is not only a *copy* of a book or a *performance* of a symphony that can be edited or revised, for example, but the book or symphony itself that can be reworked. And even if it's granted that abstract objects don't do anything strictly speaking, of course the physical objects in which they are embodied do. Compare: I assume a Cartesian might truly say 'I can run fast', even if, strictly speaking, it is the material body and not the immaterial 'I' that runs. For such linguistic attributions can be understood as indirect or elliptical. *Mutatis mutandis* for the constitution view, according to which persons are numerically distinct from their bodies. So I would think the defender of persons-as-abstract could simply help themselves to a similar strategy.³⁴

That said, I am certainly not saying these replies are decisive. As noted, I only wish to suggest there might be ways forward for the defender of uploading, as against some *prima facie* worries that have led some to dismiss the idea out of hand.³⁵ Naturally, the defender of mind uploading must do considerably more to work out a coherent metaphysics according

³³ This objection seems wrong-headed: if one person is a type, we all are. So the lover and the loved would be on equal ontological footing, (in)capable of the same things. Whence the asymmetry?

³⁴ Granted, Olson is skeptical of these strategies for other reasons, though space precludes an in-depth discussion of the dialectic here.

³⁵ There may be others as well, of course. For instance, Olson also thinks that if persons are abstract "patterns", there would be a problem identifying which pattern one is (2017: 48). But this strikes me as no different than the typical "body-minus" puzzles, or the problem(s) of the many, that afflict any account of material objects; for any given material object, it is generally accepted that there are many candidates for being that object (e.g. a given set of mereological atoms plus or minus one). That one could raise the same identification problems for abstract objects—e.g. a problem of the many generated by considering the novel *Moby Dick* plus or minus one comma—seems no more problematic than in the case of material beings- which of course Olson believes people to be.

to which minds can be multiply-instantiated. If such a metaphysics cannot be worked out, however, the result would simply be that mind uploading is impossible after all.³⁶

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